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# Visitor Perceptions About Grazing on a Forest Service Cattle Allotment

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### **Abstract**

Visitors to the Uncompahgre National Forest in southwestern Colorado were surveyed for both site-specific and general perceptions about livestock grazing on public lands. Results describe the occurrence of both positive and negative impacts, acceptable and unacceptable types of encounters, and differing levels of opposition and support for cattle grazing. Eleven grazing sub-issues are validated and implications for managers discussed.

**Keywords:** Public-lands grazing, conflict resolution, ecosystem management, forest recreation

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# Visitor Perceptions About Grazing on a Forest Service Cattle Allotment

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# Visitor Perceptions About Grazing on a Forest Service Cattle Allotment

G.N. Wallace, J.E. Mitchell, and M.D. Wells

## INTRODUCTION

The subject of livestock grazing on public lands evokes strong feelings by stakeholders both within and outside the ranching profession. Dialogue in the popular media presents opinions held by proponents and opponents alike (Wells 1995). Ecological, sociological, and economic considerations all have been used to drive the argument (Fleischner 1994, Frederick and Sedjo 1991). These indications suggest the public now maintains more interest in livestock grazing on public lands than at any time since passage of the 1934 Taylor Grazing Act. People who determine policies that govern grazing on public lands along with those who then manage public land resources according to these policies are often assailed by the opposing views.

Judging if or how much perceptions and attitudes of the general public differ from those of non-governmental organizations and other advocacy groups can be a difficult but essential task for managers (Briedé 1994). The problem is compounded because discussions about livestock grazing on Federal lands contain misinformation and have become polarized (Obermiller 1990). Research has not been conducted to describe the causes and extent of this polarity or to objectively evaluate how conflicts can be ameliorated. Findings from such work could inform those participating in ecosystem management, perhaps moderating proposed outcomes.

In one study about perceptions of U.S. rangelands, Brunson and Steel (1994) evaluated public attitudes toward Federal range management practices. Their results identified, among other things, a prevailing criticism of current range policies, a belief that range condition is worsening, support for increasing grazing fees, and uncertainty about range-specific issues. These attitudes, however, were found to lack conviction and thus were susceptible to change.

Sanderson et al. (1986) asked dispersed recreationists visiting Malheur National Forest in eastern Oregon to rate the visual resource quality of rangeland landscapes after examining photographs. Three ecosystems (mountain grassland, meadow and ponderosa pine) having three different levels of grazing management intensity were evaluated. Based on their preferred activity, visitors rated the landscape scenes differently. Fishers rated photographic scenes lower than did either hunters or campers. As a group, fishers were more sensitive to grazing practices, especially those impacting riparian areas. Campers found cattle grazing to be more appropriate in meadows and grasslands than in forested areas. The authors reported a positive relationship between the number of prior visits and higher acceptance ratings of photographic scenes.

Walsh et al. (1993) estimated the amenity value of ranchland open space in the Yampa River Valley near Steamboat Springs, Colorado. They did this by appraising actual visitor expenditures associated with ranching as well as contingent economic values that visitors assigned to ranches and ranching culture. The authors reported that grasslands with grazing cattle and horses, ranch improvements, and cowboys added to visitor enjoyment of the area. Many respondents assigned value to ranch-related activities and wanted them to be protected. Most ranches in the area depend on public lands for part of their forage, but respondents were not asked to make any connection between the deeded ranch lands they viewed and their associated public land grazing allotments.

The work described above provided no information regarding visitor perceptions about grazing or grazing effects that were actually experienced during visits to Federal lands with managed livestock allotments. Sanderson et al. (1986) used photos that were independent of the visitors' experience. The

study by Walsh et al. (1993) focused upon perceptions about livestock grazing on privately owned rangeland in the valley bottom.

Visitors who use public lands are increasingly involved in planning for the management of those lands for legal, ethical, and other reasons. Since the passage of the National Environmental Policy Act of 1969 and the National Forest Management Act of 1976, the Forest Service has been required to give individuals and nongovernmental organizations access to the land-management planning process. Visitors are also encouraged to participate because user perceptions and preferences, like resource constraints and institutional directives, are essential decision parameters and help reduce multiple-use conflicts (Floyd 1988).

Visitors' opinions about issues such as grazing are affected by both dispositional and situational factors. That is, visitors arrive with certain preformed ideas (beliefs and attitudes), and these ideas are influenced by what they see and experience on site during their visit. Although natural resource managers have no control over visitor disposition, they can attempt to modify situational factors to ameliorate conflicts over outcomes of ecosystem management. Relevant and timely interpretation may provide one approach for helping clarify what visitors perceive while on public lands and, to some degree, the values and attitudes they bring with them (Wells 1995). Modifying management practices to reduce impacts and perceptions of impact is another approach.

Any strategy for dealing with situational factors related to grazing requires information that identifies what the visiting public experiences while visiting rangelands, what they think about grazing on public lands in general, and what the sub-issues or beliefs are that shape attitudes about grazing. To address these needs, we conducted a study that solicited perceptions from visitors to the Big Cimarron watershed, Ouray Ranger District, Uncompahgre National Forest in southwestern Colorado (fig. 1). Data collection took place during the summer and fall of 1992 and 1993.

Our study contained two objectives: First, we wanted to understand visitors' perceptions of grazing on National Forest System lands managed for multiple uses. Second, we wanted to evaluate the effects of interpretive messages on those perceptions. The second objective has been discussed by Wells (1995), so this paper concentrates on the first objective.

## STUDY SITE DESCRIPTION

The Big Cimarron Cattle and Horse (C&H) Allotment occupies about 58,000 acres (23,500 ha) in the Uncompahgre National Forest. The area is on the northern flank of Colorado's San Juan Mountains and is drained by the Cimarron River and its tributaries. Ninety percent of the allotment is on multiple-use lands outside designated wilderness with the remaining 10 percent situated within the Uncompahgre Wilderness (formerly called the Big Blue Wilderness). Historically, the area was grazed by cattle and sheep. Timber harvesting and recreation constituted less predominant uses.

During the past 20 years, however, recreation has greatly increased in the Big Cimarron watershed (fig. 2). The lower, northern end of the allotment now contains a popular reservoir where the Cimarron

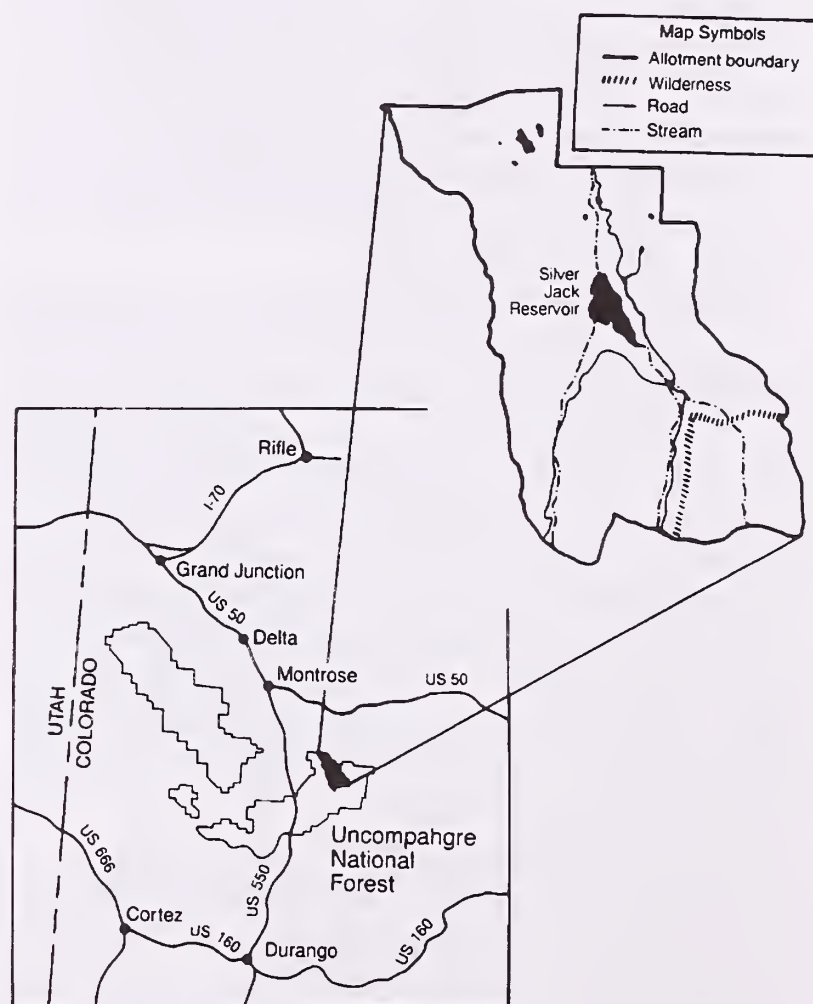


Figure 1. Big Cimarron watershed, Ouray Ranger District, Uncompahgre National Forest, Colorado.

was dammed in 1971, three developed campgrounds, many dispersed camping areas, three wilderness trailheads, and numerous hiking trails. Both stream and lake fishing are popular recreational pursuits (Wells 1995). Lands are categorized as Roaded Natural, Semi-Primitive Motorized and Semi-Primitive Non-Motorized under the Recreation Opportunity Spectrum classification system (U.S. Department of Agriculture, Forest Service 1982). One of the roads traversing the area has been designated a Scenic Byway.

Sheep are trailed through the allotment in the early summer and back again in the fall, but the Big Cimarron Allotment is primarily grazed by approximately 600 cows and their calves. The allotment is divided into eight pastures and grazed on a modified rotation schedule that alternates on a 2-year cycle. It shows impacts from grazing near some visitor use

areas, especially near lakes and streams, but is otherwise in satisfactory range condition according to standards established by the Rocky Mountain Region, USDA Forest Service (Unpublished report, Section 8 Review Team, USDA Forest Service, Denver, Colo.).

## METHODS

### SAMPLING

National Forest visitors were surveyed from both developed and dispersed recreation sites in the Cimarron watershed. Sampling units consisted of parties of one or more people who were camping or recreating together and were accessible to interviewers by road or a short hike. Surveys were adminis-



Figure 2. Silver Jack Reservoir and the Big Cimarron River are popular fishing and camping locations.

tered between June and mid-October and stratified to include expected proportional visits by day of week (weekday vs. weekend), season (spring, summer and fall), and length of visit (day use, overnight and extended stays). The sampling period included the fall hunting season until cattle were removed from the allotment.

Sampling took place in five use areas that were identified as being representative of visitors to the area, while also giving an acceptably large sample size for each Recreation Opportunity Spectrum category, including dispersed sites. The sampling population, then, was comprised of all visitors present in these five areas during the times the survey was being administered.

An adult was asked to represent the sampling unit. He/she was given a self-administered questionnaire, which was later collected. Respondents also had the option of returning their survey by mail, especially those in dispersed sites and parties traveling into or out of the Uncompahgre Wilderness.

The survey was designed using criteria similar to those suggested by Dillman (1978) and included the following five sections:

### **Section 1: About Your Visit**

The first part of this section recorded trip characteristics, activities, motives for the visit (Driver and Brown 1978), social and biophysical impacts noticed, factors affecting satisfaction or dissatisfaction with the visit, and suggested management changes that might correct sources of dissatisfaction. The section occurred before visitors became aware that subsequent components were specifically related to cattle grazing. Therefore, it provided several uncued opportunities to comment on grazing if it was a salient issue for the visitor.

In the second part of the section, respondents were provided a list of 12 categories of people and animals that use the National Forest, and invited to indicate whether each added to, neither added nor detracted, or detracted from their overall experience. They marked their answers on a scale having three response categories (Brown and Daniel 1990). Livestock was only one category of the 12 being evaluated. The categories included other visitors, campground hosts, Forest Service staff, wilderness rangers, wildlife, dogs and other pets, horseback riders, fishermen/hunters, ORV users, mountain bikers, and backpackers.

### **Section 2: About Grazing in the Big Cimarron Drainage**

This section was specifically designed to measure visitors' perceptions of cattle grazing on National Forest System lands in the Big Cimarron watershed. Responses were to be based upon actual encounters with livestock in order to show whether grazing-related conditions added to or detracted from their experience satisfaction and the kinds of encounters with livestock that were most and least acceptable.

The heading for Section 2 explained that grazing was one of several multiple uses on the National Forest; and it included a short summary of when cattle, sheep and pack stock might be encountered on the allotment. Respondents were advised that their responses pertaining to encounters with and perceptions of livestock during their visit would assist those responsible for grazing management on the allotment.

An open-ended question at the beginning of this section asked what their initial reaction to grazing in the area was. Responses were analyzed for content and condensed into five categories:

1. Those whose initial reactions were supportive of grazing in the area;
2. Those who would support livestock grazing if management goals were emphasized to accomplish goals as preventing overgrazing, keeping stock away from certain areas, leaving forage for wildlife, etc.;
3. Those who were neutral;
4. Those who did not want to see livestock or their impacts under any conditions; and
5. Those whose stated position was unclear and could not be placed into one of the first four categories.

For the 1992 sample, the next part of section two contained a list itemizing 15 descriptors of where cattle might be found, cattle-related conditions, and facilities. Five descriptors were added to the original 15 for the questionnaire used during the 1993 season. They were appended to evaluate opinions expressed by visitors during the 1992 season. Respondents were asked to indicate on a three-point rating scale whether seeing or experiencing a given condition added to, neither added nor detracted, or detracted from their overall visit.

Two open-ended questions, one asking for circumstances under which the respondent would least like to encounter livestock and the other asking for circumstances under which livestock encounters would be most favorable, followed the above-mentioned descriptors.

### **Section 3: About Public Lands Grazing in General**

This section asked respondents to take a position on the overall public lands grazing issue, and then respond to 22 statements that represented pro and con viewpoints of 11 sub-issues identified in the popular literature (Wells 1995). Specifically, respondents were requested to pick among four commonly held positions or policy statements (forced choice format) for the one that best represented their general position on grazing on public lands. Visitors were also asked how important each of the 22 sub-issue statements was in relation to their overall position on the larger public lands grazing issue. The importance of each of these sub-issue statements was estimated using Likert scales where respondents could indicate if the sub-issue was not important, somewhat important, or very important (Babbie 1992).

### **Section 4: Definitions**

This section was devised to determine how well the public understood some technical terms and ideas used in rangeland management. Respondents were asked to provide a short definition for terms such as: multiple use, ecosystem, grazing allotment, habitat, riparian area, range condition, permittee, and wilderness.

### **Section 5: About You**

This section asked respondents about the communities in which they grew up and resided currently, how often they ate meat, age, ethnicity, level of education, and household income.

The questionnaire employed a combination of open response items, rating scales, forced choices, and items requesting respondents to provide short definitions for some terms. Specific descriptors of some questions falling in these categories are included in the Results along with their associated answers.

We distributed 634 questionnaires in 1992 and 619 in 1993, with 508 and 478, respectively, being completed and returned. The overall response rate was 79 percent.

In cooperation with recreation specialists with the Ouray Ranger District and others, we developed interpretive materials for visitors to the Big Cimarron during 1993. We designed the materials to focus on some of the information gaps revealed from analyzing results from the first year. The effects of this modest interpretive treatment, while noticeable in some of the results, were not conclusive enough to discuss in this report.

An earlier paper addressed Sections 1 and 5 of the survey, relating perceptions about grazing to visitor characteristics and demographic variables (Mitchell et al. 1996). This report gives a descriptive overview of the principal findings of the study and presents management implications for public land managers and planners.

## **DATA ANALYSIS**

Frequency distributions and means were computed for all response items. Chi-square analysis was used to test for independence between the two field seasons for several items, and sub-issues were prioritized by rank-ordering mean scores (Conover 1971). Open-ended questions were analyzed for content and the comments were grouped into salient categories and frequencies computed (Babbie 1992).

We performed a cluster analysis to ascertain whether visitors could be classified on the basis of measurements pertaining to why they were visiting the Big Cimarron. Specifically, we wanted to know if respondents would cluster into identifiable groups that correlated with their position on public lands grazing (Section 3). No relationship was found between the clusters and position on public lands grazing, so results are not presented herein.

## **RESULTS**

Because of the questionnaire's format, respondents answered several open-ended questions about their visit before it became apparent to them that the study focused on grazing. Of the visitors who mentioned that something interfered with their visit (47 percent), livestock was the most frequently men-

tioned reason (9 percent of all visitors), followed closely by road conditions, other people, noise, insects, off-road vehicles, weather and other factors (table 1). Asked to describe any noticeable impacts to the natural environment, 30 percent of all visitors did so. Livestock impacts were again mentioned most frequently (8 percent of all respondents), slightly ahead of litter, off-road vehicles and other resource impacts.

How respondents evaluated the 12 categories of people and animals that are commonly encountered in the Big Cimarron watershed is shown in table 2. Visitors were about evenly split in both 1992 and 1993 as to whether livestock added to or detracted from their visit. Approximately 30 percent of those responding to that question over the 2 years identified encountering livestock as a favorable event, while the same proportion felt otherwise. Off-road vehicles distracted the most visitors, while wildlife and Forest Service staff most commonly added to their visits.

As an initial reaction, slightly more than 60 percent of all 1992-93 visitors were at least conditionally agreeable to grazing in the Big Cimarron area; however, about one-quarter of those with a positive reaction tied their support to some aspect of good management. About 20 percent had initial reactions opposing livestock grazing in the watershed (table 3).

During both years, about three-quarters of the respondents actually encountered livestock sometime during their visit to the Big Cimarron. Cattle were most frequently seen near roads, then in pastures (open areas), near streams and lakes and in forested areas. A few reported seeing cattle in campgrounds, at trailheads or along trails.

**Table 1. Primary sources of perceived interference noted by visitors to the Big Cimarron watershed, Uncompahgre National Forest, Colorado during 1992 and 1993.**

Source of interference	Percent noted
Cattle	9
Other people	7
Road conditions	6
Weather	5
Insects	5
All-terrain vehicles	4
All other sources	16
No interference noted	48

**Table 2. Categories of people and animals most likely to detract from and add to overall experience of National Forest visitors (percent) in the Big Cimarron watershed, Uncompahgre National Forest, Colorado.<sup>1</sup> Taken from a list of 12 possible categories.**

	1992 n≈490 (percent)	1993 n≈450 (percent)
<b>Detracting</b>		
Off-road vehicles	40	43
Livestock	34	26
Dogs or other pets	31	34
Other people	27	33
Mountain bikers	18	21
Horseback riders	11	8
<b>Adding</b>		
Wildlife	90	90
Forest Service staff	52	50
Fishers/hunters	38	36
Campground hosts	38	49
Other people	34	29
Livestock	32	30

<sup>1</sup> Respondents chose from answers on a five-point scale: adds a lot, adds some, neither adds nor detracts, detracts some, detracts a lot.

The most detracting kinds of encounters were related to campsites and hiking trails. Visitors did not like cattle or cowpies in or near campsites, nor cowpies along the trail (table 4). The presence of cattle along trails was seen as a detractor to a slightly lesser extent. Affected respondents also felt that the presence of flies in areas where cattle congregated detracted from their visit (table 4).

Livestock encounters that added the most to visitor experience, or were at least more accepted, tended to be associated with rangeland scenes such as cattle in the distance, cowboys herding stock, and calves with their mothers (table 4). Most visitors were fairly neutral about facilities associated with livestock management on rangelands such as corrals, cattle guards, watering tanks, salt blocks, and fences.

When asked in two open-ended questions about least and most acceptable circumstances in which to encounter livestock, visitors verified the responses they had given to the previous scaled questions. The

**Table 3. Initial reaction of visitors to livestock grazing in the Big Cimarron Watershed, Uncompahgre National Forest, Colorado (categorized from open-ended responses).**

	1992 n=475 (percent)	1993 n=475 (percent)
Positive	44	48
Positive if managed for	16	16
Neutral	8	10
Negative	23	17
Unclear position <sup>2</sup>	8	9

<sup>2</sup> An "unclear" response means one that could not be categorized as positive, neutral, or negative during content analysis.

most frequently reported categories were a desire that they not encounter livestock in camp, while fishing, while hiking on a trail, or while driving on a road. However, some respondents remarked that they enjoyed seeing cattle being trailed along a road. Acceptable encounters most commonly mentioned were in pastures, in small dispersed groups, and in places other than camp.

The proportions of respondents associating themselves with each of the four position statements about grazing on public rangelands are shown in table 5. No significant differences existed between years. About two-thirds of all respondents chose a agreeable or conditionally agreeable position about allowing grazing on public lands in the United States. Only a quarter of the respondents chose the state-

**Table 4. How conditions relating to cattle detracted from (D), did not affect (N), or added to (A) visitor experience, by year, in the Big Cimarron watershed, Uncompahgre National Forest, Colorado.**

	Percent seeing (n=508)	1992			Percent seeing (n=478)	1993		
		Response (%)				Response (%)		
		D	N	A		D	N	A
Cattle in distance	65	21	40	38	23	17	35	48
Cattle in/near campsite	30	59	26	16	50	54	32	20
Cattle in Wilderness	46	39	38	32	45	21	43	56
Cattle along streambank	44	43	33	24	43	35	37	29
Cattle on/near trails	30	47	34	19	44	38	37	25
Cowpies in campsite	28	70	26	4	52	63	30	7
Cowpies on trail	44	53	43	4	36	52	40	8
Cattle drives on road	25	32	41	28	55	23	42	35
Cowboys herding stock	27	22	40	38	57	16	38	45
Sheep grazing	—	—	—	— <sup>3</sup>	53	21	44	34
Calves with mothers	—	—	—	—	34	10	32	58
Cows mooing/bawling	—	—	—	—	33	23	43	34
Cow smells	—	—	—	—	36	40	47	12
Flies in cattle areas	—	—	—	—	37	60	35	5
Cow tracks by stream	37	38	53	9	38	37	53	10
Cattle fences	47	26	59	14	21	26	60	14
Salt blocks	13	16	73	11	53	14	74	10
Watering tanks	10	19	68	14	52	15	74	11
Cattle guards	55	14	77	19	15	17	75	8
Corrals	32	16	62	22	27	15	65	20

<sup>3</sup> Data not collected in 1992.

ment that said current grazing practices and fees are acceptable for our public lands. As can be seen, the largest category (40 percent) was comprised of visitors whose approval depended upon the proper management of rangeland ecosystems.

Given the four alternative policy statements, about one in five visitors stated they did not know enough about public-lands grazing to take a position. Fewer than one in six respondents opposed all public-lands grazing regardless of how well the land was being managed (table 5).

Ten of the 11 hypothesized sub-issues, as embodied in the 22 position statements, were validated as being important to the larger public land grazing issue. The remaining issue was deemed to be somewhat important. These are ranked in their approximate order of importance in table 6. Issues related to the biophysical impacts of grazing (e.g., range condi-

**Table 5. Overall position about public-lands grazing taken by visitors to National Forest System land, Big Cimarron watershed, Uncompahgre National Forest.**

Possible responses	1992 n=508 (percent)	1993 n=478 (percent)
Grazing on public lands under current policy is acceptable. Numbers of cattle and grazing fees should be kept at current levels to allow ranchers to make a living.	26	29
Grazing is acceptable but management should be improved to ensure good range condition, protect riparian areas, and reduce conflicts with other users. Adjustments in stocking rates, fees, and location may be necessary.	40	40
Grazing is not an acceptable use of public land. It degrades the land, favors livestock over wildlife, is not cost effective, and conflicts with other uses.	15	13
I do not know anything about grazing fees or stocking rates for livestock grazing on public lands and therefore cannot make a fair judgement about any of the positions stated above.	19	19

**Table 6. Mean importance of public-lands grazing sub-issues as appraised by visitors to the Uncompahgre National Forest. Importance scale: 1 = not important, 2 = somewhat important, 3 = important<sup>4</sup>.**

1.	[2.73]	Concern that sensitive rangelands such as hot deserts and areas with fragile soils shouldn't be grazed but are being grazed.
2.	[2.72]	The extent of overgrazing and ability to restore public lands to good condition.
3.	[2.62]	Whether grazing conflicts with wildlife or reduces wildlife habitat.
4.	[2.62]	Fairness of Federal grazing fees and criteria used to judge.
5.	[2.61]	Relative importance of ranches as buffers for public land management compared to other adjacent land uses.
6.	[2.54]	Compatibility of livestock grazing and recreation.
7.	[2.52]	Grazing in wilderness areas.
8.	[2.42]	Economic benefits provided to local communities by livestock operations and those provided by other kinds of development.
9.	[2.39]	Relative importance of public versus private lands for livestock production.
10.	[2.38]	The relationship of health and meat consumption.
11.	[2.19]	Protecting the western ranching tradition and way of life.

<sup>4</sup> Important, 2.26 - 3.00; somewhat important, 1.76 - 2.25; unimportant, < 1.75.

tion, public lands buffering, wildlife) were seen as being more important than issues related to social impacts (e.g., recreation, economic benefits, beef production, way of life).

Variation among the means for the sub-issues was not great but was high enough to demonstrate that the grazing issue is multifaceted. This is noteworthy because the public debate often focuses on one or two sub-issues and excludes the others.

## DISCUSSION AND MANAGEMENT IMPLICATIONS

### PUBLIC ATTITUDES ABOUT GRAZING ON PUBLIC LANDS

More than two-thirds of the visitors who responded to the questionnaire found grazing on public lands to be at least conditionally acceptable. However, more

than one-half of these people predicated their support on proper management, which, for many, meant actions to ensure good range condition, protect streams and lakes, and reduce conflicts with other users (table 5).

Our data allowed us to distinguish between comments that were moderately supportive or critical of cattle grazing and those that were more unequivocal. More than half of the critical respondents tended to be uncompromising about their stance. On the other hand, less than 25 percent of the respondents whose reaction was supportive of grazing took a comparably extreme perspective.

The proportion of people that were agreeable to public lands grazing, even with the qualification about management, should be useful information for those promoting sustainable multiple-resource management for similar kinds of areas on National Forest System lands. Within that context, our study indicates that the popular media portray pro and con attitudes about livestock grazing on public lands as being more polarized than was the case in the Big Cimarron (Elliott et al. 1995).

When the findings of a nationwide survey by Brunson and Steel (1994) are compared with the site-specific results of this study, one important difference emerges. While one-third of those responding in the nationwide study agreed that "grazing should be banned on federal rangelands," only 14 percent of the visitors to the Big Cimarron found cattle grazing to be a totally unacceptable use of public lands. The distinction probably results from differences in the two sampling populations. People who actually visit National Forest System lands may be somewhat more likely to identify with a policy that allows grazing than does the general public. Moreover, the background influence of rangelands that were largely in satisfactory range condition may have helped some visitors be more accepting of livestock grazing.

Individuals and groups who interpret the above results as being sympathetic to grazing on public lands should also keep the following points in mind. First, our study took place in an area that had a relatively high percentage of local and regional visitors, who would be expected to be more familiar with livestock as a part of their everyday environment than other visitors (Mitchell et al. 1996). Second, the study site was a montane area in relatively good range condition with a few localized exceptions. The principal rangeland ecosystems on the Big Cimarron

C&H Allotment are dominated by quaking aspen (*Populus tremuloides*), Thurber fescue (*Festuca thurberi*), and riparian communities (Personal communication, Jim Free, District Ranger, Ouray Ranger District, Uncompahgre National Forest, Montrose, Colo.). Each of these range sites provide good forage species and are fairly resilient to grazing (Heady and Child 1994, U.S. Dept. of Agriculture, Forest Service 1937).

A number of cattle-related impacts, both social and biophysical, were noticed by visitors. Such impacts detract from visitor experiences, even among those who accept or support livestock grazing on public lands. In addition, those who oppose grazing on public lands feel more strongly about their position and beliefs than do those who are supporters. This finding was corroborated in a previous analysis of the same data set using other variables (Mitchell et al. 1996). We also noticed during the content analysis that the length and complexity of the open-ended comments provided by those opposing public-lands grazing exceeded responses by those who were supportive.

Replications in a variety of areas will be needed to have an adequate picture of the sentiments of those who witness grazing on public lands on a broader scale. Future studies of this nature should also test for self-selection response bias by, among other things, comparing the responses of those who expected to find cattle with those who did not.

## IMPLICATIONS FOR RANGE AND RECREATION MANAGERS

Several situational or on-site variables that affect visitor perceptions of grazing are described in this report and might be acted upon by managers. Allotment analysis and allotment management plans (AMP's) tend to focus on environmental factors such as range condition, wildlife needs, and watershed condition (Ellison 1949). With increasing visitor use on the Big Cimarron and similar areas, AMP's could include a number of social-impact criteria that can be used to moderate potential conflicts between livestock and other users.

The timing of allotment activities seems important. Moving cattle along roadways and onto or away from an allotment could occur during weekdays and periods of lower visitation. When livestock are moved along roadways, it may be important to adjust visitor expectations by posting signs announcing this activ-

ity above and below where the trail drive will occur. Studies have shown that an adjustment in expectation can reduce visitor dissatisfaction (Manning 1986).

Minimizing the time that higher densities of cattle are found near visitor-use areas as cattle are brought into or shipped from the allotment may reduce perceived impacts to the visitor experience. During peak visitation periods, it may be worthwhile to have riders in the area moving livestock away from lakes, streams, and other visitor-use sites. Several benefits could occur if this were to happen. Seeing cowboys herding stock added to more than it detracted from visitor experience, and herding is a way of showing visitors that management is occurring. More importantly, this reduces the encounters with livestock in the areas where visitors have said they least like to have them (near camps, at trailheads, lower trail segments, near streams and lakes) and makes livestock encounters more probable in the areas that visitors find most acceptable (cattle in the distance, in small dispersed groups).

The location of recreation facilities and livestock handling facilities, including fences, watering structures, and salt, is a pertinent consideration. Visitors were not overly impacted by the presence of facilities themselves, but they were influenced by cattle in large numbers or located too close to their activity areas. Since facilities can represent management if interpreted for the public as such, optimal locations may exist for facilities that are neither close nor totally out of view. Dispersal and forage utilization have always been objectives linked with salt placement, watering structures, and drift fences. Now, the location of recreational use areas might also be considered in the AMP.

Riparian areas, due to their higher levels of biotic diversity and the support they provide to both terrestrial and aquatic flora and fauna, have acquired more relevance in recent years as areas for monitoring environmental impacts (Hubbard 1977). They are also essential for cattle grazing because of their concentrated forage supply and available water (Roath and Krueger 1982). Both this study and the eastern Oregon study done by Sanderson et al. (1986) show riparian zones are of special importance to National Forest System visitors. Thus, monitoring that uses both social and biophysical indicators in riparian areas may be most efficient in controlling visitor-livestock conflicts.

Information and education can be used by managers to affect visitor perceptions and attitudes. Brunson

and Steel (1994) showed that the public has misperceptions about the condition of rangelands. Open-ended remarks in our study indicated that some visitors perceived the Big Cimarron allotment to be in bad range condition. Both studies had high percentages of neutral answers, which Brunson and Steel (1994) attributed in part to uncertainty about grazing issues, especially range-specific issues. Our results also show that the predominant position on grazing selected by Big Cimarron visitors is one where support for grazing hinges on the person's knowing that good management is occurring or that improvements are being made.

Given the above, it follows that managers would benefit from helping visitors understand more about range management and range condition. For example, several comments received during our study associated overgrazing with short vegetation. Providing interpretative materials that explain about rangeland health cannot be expected to succeed unless accompanying management actions have led or are heading toward satisfactory range condition, particularly in areas where visitor-livestock interactions are notable. The Society for Range Management has a standing committee, Excellence in Range Management, whose goal is to identify and publicize range management success stories. They have found the use of short videos to be effective in describing how lands can be improved under proper grazing management.

Interpretation methods have not yet been conclusively demonstrated to mitigate adverse visitor perceptions of livestock grazing. However, where range management practices can be shown to support sustainable ecosystem management, interpreting these practices for the public may reduce conflicts by influencing those visitors whose attitudes are susceptible to change (Wells 1995). This view is reinforced by the prioritization of sub-issues. The three sub-issues rated as most important to the overall grazing issue were linked to sensitive areas, range condition, and wildlife (table 6).

Looking further at visitor evaluations of the importance of sub-issues, our results suggest that all 11 are real in the minds of visitors. Since none was evaluated as being unimportant, any comprehensive approach to information and education about public lands grazing should encompass the range of issues if public attitudes about grazing are to be knowledgeable. Managers will note that some issues are more impor-

tant than others and may have a greater effect in shaping general attitudes about public-lands grazing.

Information and education should occur both on-site and off-site. Ivy et al. (1992) discussed the importance of addressing both situational and dispositional factors in reducing conflict and increasing tolerance. Range management practices that reduce on-site impacts and inconveniences for visitors will collectively increase tolerance and reduce conflict (Wells 1995). The desired effects of range management practices can conceivably be reinforced by interpretation tools that describe to visitors how this is being done. Interpretation should address the beliefs that affect the attitudes or disposition that visitors bring with them.

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